in the pipe is also obtained. The danger of the period of oscillation in the tank synchronising with the governor is pointed out, and Johnson's differential surge tank, introduced to overcome this difficulty, is described. The concluding chapters deal with the general arrangement of stations and water-power reports. The text is clearly written and the illustrations are very good.

F. C. L.

Progress in Fat and Oil Chemistry.

Chemical Technology and Analysis of Oils, Fats and Waxes. By Dr. J. Lewkowitsch. Sixth edition, entirely revised by G. H. Warburton. Vol. 1. Pp. xviii + 682. Vol. 2. Pp. xii + 959. (London: Macmillan and Co., Ltd., 1922). 36*s.* and 42*s.* net.

THE successive editions of Lewkowitsch's "Oils and Fats"—now carried on by his successor, Mr. G. H. Warburton—are regarded almost as milestones by those engaged, in whatever capacity, in the industries based on these products, and their appearance affords a fitting moment for taking stock. It is perhaps of interest that the third edition was noticed in NATURE of September 22, 1904, p. 502, the fourth in the issue for August 19, 1909, p. 211, and the fifth in the issue for December 18, 1913, p. 449. The book is now of such size that this—the sixth edition—is like its predecessor, divided into three volumes of which only the first two have so far appeared. The index, unfortunately for the reader and the reviewer, is confined to the third volume, so that reference to these volumes is far from easy. We would strongly urge that this defect in so valuable a work be rectified in the future, as the temporary use of the first two volumes is impaired, and the reader in the future has to go to the labour of consulting two heavy volumes for the desired information.

Volume 1 as heretofore is devoted to the chemistry and analysis of the fats, a side which during the last decade has been relatively neglected. Volume 2, after an all too brief introductory section devoted to the obtaining of oils by the various methods of practice, deals in detail with the properties of the several oils. Volume 1 is described on the title page as entirely re-written and enlarged, and volume 2, more circumspectly, as entirely revised. Both volumes, however, would be more properly described as revised, as little more has been done than to bring them up-to-date by the addition of new matter. No doubt in the remaining volume, which deals with a section of the subject in which very great progress has been made largely as the result of the altered conditions brought about by the war, much will have to be rewritten, but it is scarcely correct to apply this phrase to these volumes. From this point of view the new edition is frankly a disappointment: opportunity might have been taken to prune much which was diffuse and indefinite, and really to keep the work up-to-date in a crisp form. As it is, the reader at all versed in the subject will more often than not experience disappointment on consulting it, while for those who have the former edition the expenditure of a somewhat large sum on the new issue cannot be justified.

It is to be regretted that the study of the chemistry of fats and allied compounds is not at present fashionable amongst schools of chemical research, possibly in part because of the difficulty of the subject and the need to tackle it by what may be termed team work before results can be obtained. However this may be, the field of research is full of the most interesting possibilities both in the domain of pure organic, of physical and of biological chemistry. We may cite the work of Hardy, Adam, Langmuir, and others in this connexion, and the pioneer work on the synthesis of mixed glycerides commenced by Emil Fischer just before his death, with the hope that some of our workers will once more be attracted into this field of inquiry. Analytical work such as is embodied in volume 2 of the book is of interest technically, but the number of oils of prime industrial importance is limited to those which can be produced in quantity, and with sufficient regularity to make it an economical proposition to instal the requisite machinery to deal with them. Consequently, but few of the newer oils described become of practical interest: the world shortage of oils and fats so confidently predicted by the expert a few years ago has failed to materialise, so that there is no demand for new oils; indeed, to-day most of the vegetable oils are being marketed at prices unremunerative to the grower and manufacturer.

What is mainly wanted at the present time is far greater attention to quality: in this connexion it should be emphasised how little is known as to the manner of production of oils in plants, and the supposed change in the proportion of saturated to unsaturated acids in the oil during the ripening of the seed; also the cause of the development of fatty acid in the oil and its increase during storage. There is an opportunity for much research on the part of the biochemist in this direction.

The structure of a long open chain organic compound and the points of weakness at which it is most susceptible to attack is a question of prime interest to the chemist. The close packing hypothesis of Pope and Barlow, the modern crystal structure theory of the Braggs, and the recurrent spiral structure resembling a drawn-out coil of wire attributed to it of others, all have their adherents, and additional practical data are

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most desirable. The hydrocarbons themselves are unsuitable for this purpose, but the fatty acids with their crystalline derivatives afford much more desirable material for research.

While in no way depreciating the enormous amount of information contained in the book, which virtually makes it an exhaustive dictionary, it is permissible to suggest that from the point of view of the user, a much more careful selection and limitation of the material would be an advantage. E. F. A.

Our Bookshelf.

Die chemische Analyse. Herausgegeben von Dr. B. M. Margosches. VIII.-IX. Band: Methoden zur Untersuchung von Milch und Molkereiprodukten. Von Dr. Kurt Teichert. Pp. 374. (Stuttgart: F. Enke, 1909.) 11.40 marks (England: 45.60 marks).

ON account of the interest now being shown in the quality of our milk supply, attention may be usefully directed to this book. It deals exclusively with milk and dairy products and forms the eighth and ninth volume of the general treatise on chemical analysis. The greater part of the space is devoted to the standard methods of analysis, but there is in addition a large amount of information which ought to be of help to the analyst and medical officer of health.

A preliminary section deals with the composition and properties of milk and the factors which are responsible for any change in the normal composition. Following this comes the portion which is concerned with the detailed analytical methods for the determination of fat, milk sugar, protein, etc. The chapter on cleanliness of milk and its freedom from bacterial contamination puts the facts in a clear and convincing manner, and is very valuable in view of the recognition of the dangers of uncleanliness both from the standpoint of public health and the manufacture of such products as butter and cheese. In this connexion the employment of the reductase and catalase tests has not become so general as was at one time expected, although the direct determination of dirt is now a regular practice in all analytical and public health laboratories, and leads to the punishment of those who dispose of filthy and insanitary milk.

Purely bacteriological methods of examination are shown to be difficult, particularly when applied to the detection of pathogenic organisms. The fermentation test, which is easily and rapidly carried out, is now being used to a greater extent both in connexion with the public milk supply and the cheese factory.

The chapter on the adulteration of milk, and the interpretation of the results of analysis obtained in this connexion, is valuable, as is also the one on the testing of cream, skim milk, whey, condensed milk, etc.

As in the case of milk, so with butter and cheese there are given details of analytical methods and hints on the interpretation of results. The detection of adulteration by the addition of foreign fats is dealt with, and other sections are concerned with the analysis of materials used in the preparation of cheese.

The volume is one for reference and the details appear to be scientifically sound.

Aeroplane Performance Calculations. By Harris Booth. (The Directly-Useful Technical Series.) Pp. xv+207. (London: Chapman and Hall, Ltd., 1921.) 21*s.* net.

THE development of aviation appears to be entering on a new phase in which "safety in the air" is singled out as of primary present importance. This follows an era of military devotion to the cult of "performance," and the object of the book under review appears to be the statement of the detailed steps which have hitherto been taken to secure the greatest speed and maximum rate of climb of an aeroplane.

It is probable that the actual arithmetical processes described will rapidly fall out of use, but that the principles invoked will have a greater degree of permanence. The interest of the book is not so much in the relative merits of the four methods of prediction of aeroplane performance described in chapter 11. as in the statement of the problem as it appears to a designer. Much of the book shows the individuality of the author, but the general outlook is typically that of the community of aeroplane designers.

It is perhaps desirable at this point to indicate the established position as to aeroplane design and its relation to performance. The data used by all are common—derived mainly from sources external to the aviation industry—and have been used with almost equal success by a number of designers. In the result it is found possible to predict the consequences of the best efforts from preliminary sketch designs. To realise completely the maximum performance, it is necessary for a designer to consider the details of his craft carefully, and Mr. Harris Booth's book shows how that may be done. Further, it illustrates an essential element of progress, for it assesses in numerical form the importance of separate items in the complete whole. In illustration of this point, it will be found that 14 lbs. is estimated to be the resistance of a flying-boat hull if the open cockpits and hydroplaning steps are excluded. A further estimate shows that the steps account for 52 lbs. at the same speed and each cockpit for a further 17 lbs. Here is a striking example of the fact that the very small resistance of a smooth streamline body may be increased five- or six-fold by departures required for various reasons.

It is just because of its indications of the need for care in design that the present volume may fairly be accorded a place on the shelves of an aeronautical or design office library. So far as can be judged its importance is limited to such function, since the writer is following common practice in supposing that "performance" does not include "safety."

Building Contracts: The Principles and Practice of their Administration. By Edwin J. Evans. (The Directly-Useful Technical Series.) Pp. xviii+304. (London: Chapman and Hall, Ltd., 1922.) 10*s.* 6*d.* net.

THE building trade resembles a good many others in that, while liberally supplied with works on the technical side, there is very little literature dealing with the business side. The present volume is intended to fill this gap. The subject matter is divided into four

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